REMARKS

This is intended as a full and complete response to the Office Action dated November 15, 2007, having a shortened statutory period for response set to expire on February 15, 2008. In view of the following amendment and discussion, the Applicants believe all claims are in allowable form.

CLAIM REJECTIONS

A. 35 U.S.C. §103 Claims 1-5

Claims 1-5 stand rejected under 35 U.S.C. §103(a) as being unpatentable over United States Patent Publication No. 2003/0194495 published October 16, 2003 to *Li, et al.* (hereinafter referred to as "*Li*") in view of United States Patent No. 6,211,096 issued April 3, 2001 to *Allman, et al.* (hereinafter referred to as "*Allman*"). In response, the Applicants have hereby resubmitted an updated declaration under 37 C.F.R. § 1.131 including signatures of all inventors, Francimar C. Schmitt, Kimberly Branshaw, assignee representative of Padmanabhan Krishnaraj, and Hichem M'saad, as requested by the Examiner. As Mr. Padmanabhan Krishnaraj is deceased, under MPEP 715.04 I. (D), the Assignee submits a declaration under 37 C.F.R. § 1.131 because it is not possible to produce the affidavit or declaration of the inventor. It is believed that the declaration removes *Li* as a reference and that the claims are allowable. Allowance of the claims is, therefore, respectfully requested.

Allman teaches depositing a dielectric film with tunable dielectric constant by adding different sources during depositing. The Examiner asserts that *Allman* teaches the method of varying the proportions of oxidizing gases to help "tune" the dielectric constant of a film, citing Col. 4, Lines 33-50 and Col. 5 Lines 1-5 of *Allman*'s specification. However, the Applicants respectfully submit that *Allman* teaches different gas ratios of N_2O and O_2 gas along with different selected precursors to produce a low-k or high-k film. As pointed out by the Examiners cited in Col. 5 Lines 1-5 of *Allman*'s specification, *Allman* states that "the ratio of N_2O to O_2 in the source gas can be in the range of 1:1 to 1200:1 with a preferable setting of 200:1." Therefore, *Allman* teaches preferably using a significantly greater amount of N_2O gas relative to the amount of O_2 gas, or at least equal amounts of N_2O gas and O_2 gas, along with TEOS gas to produce

a low-k film. In other words, the high amount of N_2O gas constitutes the majority of the total oxygen containing gas mixture. As admitted by the Examiner, *Allman* teaches using this particular selected ratio of N_2O gas to O_2 gas to produce a low-k film.

However, *Allman* does not teach or suggest a ratio of a flow rate of the N_2O to a total flow rate of the two or more oxidizing gases into the chamber between about 0.1 and about 0.5, as recited by claim 1. More specifically, *Allman* does not teach or suggest a ratio of N_2O gas to total oxidizing gases between about 0.1 and about 0.5 to deposit a low-k dielectric film. In contrast, the example of *Allman* cited by the Examiner in the previous Office Action dated April 8, 2007 is for depositing a high-k dielectric film. (Col. 6, Lines 14-16 and 55-60; Col. 7, Lines 5-10 of *Allman*). Moreover, the precursors taught by *Allman* used for depositing high-k layer does not include a cyclic organosiloxane. Since *Allman* does not teach or suggest a method for depositing a low-k dielectric film as claimed, *Allman* can not teach or suggest all the claimed elements. As such, a *prima facie* case of obviousness has not been established as the references fail to teach each claimed element.

Thus, Applicants submit that independent claim 1 and all claims depending therefrom are patentable over *Li* in view of *Allman*. Accordingly, the Applicants respectfully request the rejection be withdrawn.

B. 35 U.S.C. §103 Claims 1-5

Claims 1-5 stand rejected under 35 U.S.C. §103(a) as being unpatentable over United States Patent Publication No. 2001/0034140 published October 25, 2001 to *Shioya, et al.* (hereinafter referred to as "*Shioya*") in view of *Allman*. In response, the Applicants have amended claim 1 to more clearly recite certain aspects of the invention.

Shioya teaches a method to deposit a silicon carbon film. However, *Shioya* does not teach or suggest depositing a low dielectric constant film having a carbon content between about 5 and about 30 atomic percent, as recited by claim 1. The teachings of *Allman* have been discussed above. *Allman* does not teach or suggest depositing a low-k dielectric constant film having a carbon content between about 5 and about 30 atomic percent. Moreover, there is no teaching from *Allman* (*i.e.*, method for depositing high-k materials) that would suggest with a reasonable expectation of success to one of

ordinary skill in the art to modify the teaching of *Shioya* in a manner that would yield depositing a low dielectric constant film that has a carbon content between about 5 and about 30 atomic percent, as recited by claim 1. As such, a *prima facie* case of obviousness has not been established as the references fail to teach each claimed element.

Thus, Applicants submit that independent claim 1 and all claims depending therefrom are patentable over *Shioya* in view of *Allman*. Accordingly, the Applicants respectfully request the rejection be withdrawn.

C. 35 U.S.C. §103 Claim 6

Claim 6 stands rejected under 35 U.S.C. §103(a) as being unpatentable over *Li* in view of *Allman* and further in view of United States Patent No. 6,582,777 issued June 24, 2003 to *Ross, et al.* (hereinafter referred to as "*Ross*"). The Applicants respectfully disagree and traverse.

Independent claim 1, from which claim 6 depends, recites elements not taught or suggested by the combination of *Li, Allman* and *Ross*. As discussed above, *Li* is not prior art. Furthermore, the patentability of claim 1 over *Li* and *Allman* has been discussed above. *Ross* is cited by its teaching for exposing a chemical vapor deposited dielectric layer to electron beam radiation for a sufficient time. *Ross* does not teach or suggest delivering a gas mixture comprising two or more oxidizing gases comprising N_2O and O_2 to a substrate in a chamber, wherein a ratio of a flow rate of the N_2O to a total flow rate of the two or more oxidizing gases into the chamber is between about 0.1 and about 0.5 and wherein the low dielectric constant film has a carbon content between about 5 and about 30 atomic percent. Therefore, there is no teaching or suggestion from *Ross* that would suggest with a reasonable expectation of success to one of ordinary skill in the art to modify the *Allman* method for depositing high-k materials in a manner that would yield delivering a gas mixture comprising two or more oxidizing gases comprising N_2O and O_2 to a substrate in a chamber, wherein a ratio of a flow rate of the N_2O to a total flow rate of the two or more oxidizing gases into the chamber is between about 0.1 and about 0.5 to deposit a low dielectric constant film, as

recited by claim 1. As such, a *prima facie* case of obviousness has not been established as the references fail to teach each claimed element.

Thus, Applicants submit that claim 6, which depends from claim 1, is patentable over *Li* in view of *Allman* and further in view of *Ross*. Accordingly, the Applicants respectfully request the rejection be withdrawn.

D. 35 U.S.C. §103 Claims 7 and 9-13

Claims 7 and 9-13 stand rejected under 35 U.S.C. §103(a) as being unpatentable over *Li*. In response, the Applicants have amended claim 7 to more clearly recite certain aspects of the invention.

As discussed above, *Li* is not prior art. As such, a *prima facie* case of obviousness has not been established as the references fail to teach each claimed element. Thus, Applicants submit that independent claim 7 and all claims depending therefrom are patentable over *Li*. Accordingly, the Applicants respectfully request the rejection be withdrawn.

E. 35 U.S.C. §103 Claim 14

Claim 14 stands rejected under 35 U.S.C. §103(a) as being unpatentable over *Li* in view of *Ross*. In response, the Applicants have amended claim 7 to more clearly recite certain aspects of the invention.

Independent claim 7, from which claim 14 depends, recites elements not taught or suggested by the combination of *Li* and *Ross*. As discussed above, *Li* is not prior art. *Ross* is cited for its teaching of exposing a chemical vapor deposited dielectric layer to electron beam radiation. *Ross* does not teach or suggest a gas mixture comprising a cyclic organosiloxane, and an oxidizing gas consisting essentially of a N_2O and a O_2 gas to a substrate in a chamber, wherein a ratio of flow rate of N_2O to a total flow rate of the N_2O and the O_2 gas is between about 0.1 and about 0.5 and wherein the low dielectric constant film has a carbon content between about 5 and about 30 atomic percent. Therefore, there is no teaching or suggestion from *Ross* that would suggest with a reasonable expectation of success to one of ordinary skill to deposit low dielectric constant film by delivering a gas mixture comprising a cyclic organosiloxane, and an

oxidizing gas consisting essentially of a N_2O and a O_2 gas to a substrate in a chamber, wherein the N_2O is delivered into the chamber at a flow rate between about 0.71 sccm/cm^2 and about 1.42 sccm/cm^2 of substrate surface, wherein a ratio of flow rate of N_2O to a total flow rate of the N_2O and the O_2 gas is between about 0.1 and about 0.5, wherein the low dielectric constant film has a carbon content between about 5 and about 30 atomic percent, as recited by claim 7. As such, a *prima facie* case of obviousness has not been established as the references fail to teach each claimed element.

Thus, Applicants submit that claim 14, which depends from claim 7, is patentable over *Li* in view of *Ross*. Accordingly, the Applicants respectfully request the rejection be withdrawn.

F. 35 U.S.C. §103 Claims 7 and 9-13

Claims 7 and 9-13 stand rejected under 35 U.S.C. §103(a) as being unpatentable over *Shioya* in view of *Allman*. In response, the Applicants have amended claim 7 to more clearly recite certain aspects of the invention.

As discussed above, *Shioya* teaches a method to deposit a silicon carbon film. However, *Shioya* does not teach or suggest depositing a low dielectric constant film having a carbon content between about 5 and about 30 atomic percent, as recited by claim 7. The teachings of *Allman* has been discussed above. *Allman* does not teach or suggest depositing a low dielectric constant film having a carbon content between about 5 and about 30 atomic percent. Moreover, there is no teaching from *Allman* that would suggest with a reasonable expectation of success to one of ordinary skill in the art to modify the teaching of *Shioya* in a manner that would yield depositing a low dielectric constant film that has a carbon content between about 5 and about 30 atomic percent, as recited by claim 7. As such, a *prima facie* case of obviousness has not been established as the references fail to teach each claimed element.

Thus, Applicants submit that independent claim 7 and all claims depending therefrom are patentable over *Shioya* in view of *Allman*. Accordingly, the Applicants respectfully request the rejection be withdrawn.

G. 35 U.S.C. §103 Claim 14

Claim 14 stands rejected under 35 U.S.C. §103(a) as being unpatentable over *Shioya* in view of *Allman* and further in view of *Ross*. In response, the Applicants have amended claim 7 to more clearly recite certain aspects of the invention.

Independent claim 7, from which claim 14 depends, recites elements not taught or suggested by the combination of *Shioya, Allman* and *Ross*. As discussed above, the combination of *Shioya* and *Allman* does not teach or suggest depositing a low dielectric constant film having a carbon content between about 5 and about 30 atomic percent. *Ross* is cited for its teaching of exposing a chemical vapor deposited dielectric layer to electron beam radiation. *Ross* does not teach or suggest depositing a low dielectric constant film having a carbon content between about 5 and about 30 atomic percent. Therefore, there is no teaching or suggestion from *Ross* that would suggest with a reasonable expectation of success to one of ordinary skill in the art to modify *Shioya* and *Allman* in a manner that would yield delivering a gas mixture comprising a cyclic organosiloxane, and an oxidizing gas consisting essentially of a N_2O and a O_2 gas to a substrate in a chamber, wherein the N_2O is delivered into the chamber at a flow rate between about 0.71 sccm/cm^2 and about 1.42 sccm/cm^2 of substrate surface, wherein a ratio of flow rate of N_2O to a total flow rate of the N_2O and the O_2 gas is between about 0.1 and about 0.5, wherein the low dielectric constant film has a carbon content between about 5 and about 30 atomic percent, as recited by claim 7. As such, a *prima facie* case of obviousness has not been established as the references fail to teach each claimed element.

Thus, Applicants submit that claim 14, which depends from claim 7, is patentable over *Shioya* in view of *Allman* and further in view of *Ross*. Accordingly, the Applicants respectfully request the rejection be withdrawn.

DOUBLE PATENTING

Claims 1-5 stand rejected under obviousness-type double patenting as being unpatentable over claims 1, 9 and 13-14 of United States Patent No. 6,797,643 in view of *Allman*. Claim 6 stands rejected under obviousness-type double patenting as being unpatentable over claim 1 of United States Patent No. 6,797,643 in view of *Allman* and

in view of *Ross*. Claims 7 and 9-13 stand rejected under obviousness-type double patenting as being unpatentable over claims 1, 9 and 13-14 of United States Patent No. 6,797,643 in view of *Li*. Claim 14 stands rejected under the obviousness-type double patenting as being unpatentable over claim 1 of United States Patent No. 6,797,643 in view of *Ross*. Claims 7 and 9-13 stand rejected under obviousness-type double patenting as being unpatentable over claims 1, 9 and 13-14 of United States Patent No. 6,797,643 in view of *Allman* and further in view of *Shioyai*. Claim 14 stands rejected under obviousness-type double patenting as being unpatentable over claim 1 of United States Patent No. 6,797,643 in view of *Allman and Shioya*. In response, the Applicants agree to file a Terminal Disclaimer under 37 C.F.R. §1.130(b) to obviate the rejection once the rejections to the claims under 35 U.S.C. §§102, 103 and 112 have been withdrawn.

CONCLUSION

Thus, for at least the reasons discussed above, Applicants submit that all claims are in condition for allowance. Accordingly, the Applicants respectfully request reconsideration of this application and its early allowance.

If the Examiner believes that any unresolved issues still exist, it is requested that the Examiner telephone Mr. Keith Taboada at (732) 530-9404 so that appropriate arrangements can be made for resolving such issues as expeditiously as possible.

Respectfully submitted,

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